DOCUMENT RESUME

ED 347 976 IR 015 713

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TITLE Instructional Design Practices and Teacher Planning Routines.
PUB DATE Feb 92
NOTE 10p.; In: Proceedings of Selected Research and Development Presentations at the Convention of the Association for Educational Communications and Technology and Sponsored by the Research and Theory Division; see IR 015 706.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Advanced Placement Programs; Correlation; *Instructional Design; Intellectual Disciplines; Learning Processes; Lesson Plans; Predictor Variables; School Surveys; Secondary Education; *Secondary School Teachers; Systems Approach; *Teacher Role
IDENTIFIERS *Instructional Design Professionals; *Teacher Planning

ABSTRACT

The hypothesis that the planning activities of classroom teachers correlate with the practices of instructional design professionals is explored within the context of this study. Classroom teachers participated in a survey which requested information regarding their planning routines. The 35-item two part questionnaire that was used as the data collection instrument was sent to 110 teachers currently teaching grades 7 through 12. including teachers participating in university-school partnership programs. The 61 who returned the questionnaires (56%) reported on their actions when planning to teach on a daily basis, and provided information on typical class size, number of years teaching, grade level, educational background, and subject taught. Analyses of the responses indicate that a strong correlation exists between teacher planning activities and instructional design practices, although the subject taught is the only variable studied that seems to affect the potential for teachers to practice instructional design. It is suggested that some instructional design practices may be beyond the realm of manipulation by public school teachers, and that a dialog between instructional design professionals should be formalized. It is also suggested that instructional designers should consider instructional design models that combine common teacher planning routines with instructional design practices. (38 references) (BBM)

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Title:

Instructional Design Practices and Teacher Planning Routines

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Abstract

The hypothesis that the planning activities of classroom teachers correlate with the practices of instructional design professionals is explored within the context of this study. Classroom teachers participated in a survey which requested information regarding their planning routines. A 35-item two part questionnaire was used as the data collection instrument. Sixty-one public school teachers reported on their actions when planning to teach on a daily basis, and indicated such demographic information as typical class size, number of years teaching, grade level and educational background. Results indicate that a correlation exits between teacher planning activities and instructional design practices, and that such a relationship is influenced by the subject taught.

Preliminary investigations of teachers as instructional designers (Branch, 1986; Branch, Darwazeh & El-Hindi, 1991) suggest there is a false assumption that teachers do not engage in instructional design practices. Further, instructional design jargon tends to inhibit communication between instructional design professionals and public school teachers. In addition, it appears that certain teacher profiles may enhance the potential for teachers to practice instructional design or that the contextual factors which encompass public school environments make the use of traditional instructional design models impractical.

This called for a shift of the focus on teachers as instructional designers away from the perspective of the instructional designer and more toward the perspective of the public school classroom teacher. In order to accomplish this there was a need to identify teacher planning practices and instructional design practices that are essentially similar in purpose and orientation, but different in execution. This also prompted a need for identifying correlations between the potential for teachers to practice instructional design and contextual factors such as number of years teaching, class size and education level of the teacher.

This is a report of an investigation which sought to answer the fundamental question: Do teachers practice instructional design? from the perspective of public school teachers. This study was conducted based on teacher planning research conducted during the past decade which suggests that teachers actively develop routines which are executed in the school environment (Applefield & Earle, 1990; Earle, 1985; Kerr, 1981; Sherman, 1978; Zahorik, 1975). The process for developing teacher planning routines has evolved from experienced educational practices as well as from current teaching theories and learning theories. Instructional designers systematically select, adapt, develop and refine a wide variety of instructional products (Martin, 1984). The process of instructional design evolved from a conceptual amalgam of general systems theory (Banathy, 1968; 1973), the application of technology to educational methodology (Chisholm & Ely, 1976), and the psychology of learning (Gagne, 1977). A review of instructional design procedures and teacher planning routines literature (Andrews & Goodson, 1990; Briggs & Wager, 1981; Dick & Carey 1990; Gagne, Briggs, & Wager 1992; Merrill 1983; Merrill, Reigeluth, & Faust 1979; Pratt, 1980; Reigeluth, & Stein, 1983; Earle, 1985; Yinger, 1979; Zahorik, 1975) reveals that teachers and instructional designers are involved in similar basic activities such as: planning, designing lesson plans, designing unit plans, designing test items, stating objectives, managing, evaluating, and consulting. Instructional designers tend to focus on selecting instructional materials, analyzing content, sequencing content, and decision-making; whereas, teachers focus primarily on the implementation and evaluation of instruction.

Because teachers are at the "front line" in the educational process (Earle, 1985), understanding the logic of their actions is important as educators attempt to increase the efficiency of the educational process. Beilby (1974) emphasized the importance of instructional development for teachers by questioning the view that the instructional design process must be managed by the education specialist. Beilby (1974) presented a strong case for teacher involvement in instructional design and stressed the need for training teachers for the instructional designer role. In the past teachers have developed instructional design skills through 1) the pre-service curriculum, 2) in-service training, and 3) working with an instructional designer to improve present courses. While the second two needs are important, it is the first need, the pre-service teacher preparation curriculum, this project addresses by developing an inventory of teacher planning information that focuses on instructional designer competencies which might be incorporated into teacher preparation programs.

The rationale for this investigation is that successful teachers engage in similar actions to those associated with instructional design when preparing to teach. But, does this mean teachers are instructional designers? According to Kerr (1981): "Teachers are and are not instructional designers. Most teachers have not had formal training in the procedures commonly used by instructional designers: many find it difficult to shift their thinking into instructional design (ID) patterns when they are asked to do so as part of a course

or workshop" (p. 364). This can be partly attributed to the less than positive attitude of some teachers toward the use of instructional design models out of fear that a systematic approach restricts creativity (Branch, 1986). Instructional design ideology adopts the position that a systems approach promotes creativity by increasing the number of alternatives generated and by testing instructional options prior to implementation.

Traditionally, educators and instructors have determined the major elements of the instructional process to be students, teachers, and curriculum. Since 1970, however, rapid technological advances have necessitated bringing the instructional designer into the core of the instructional process. The systematic design of instruction is usually considered to be the role of the instructional designer. There is a trend among instructional design professionals however, to focus attention on the need for preparing and training public school teachers for the instructional designer's role (Applefield & Earle, 1990; Dick & Reiser, 1989; Earle, 1985).

The contention is that there is a correlation between teacher planning routines and what instructional designers do when designing instruction. In order to support this belief, a systematic investigation is being conducted to determine the extent of this correlation.

Instructional Episode

Instruction, as subsumed under the concept of curriculum (Reigeluth, 1983), is the intervention that occurs during a content-media-teacher interaction where the expressed goal is to facilitate the progression of a learner from point A to point B along the educational continuum. An accurate assessment of learner characteristics, a thorough analysis of content attributes, and the potential of the teacher to facilitate the learning process are the independent variables within the instructional environment that the designer or teacher attempts to manipulate in order to create or improve instruction. This specific period of interaction is hereafter referred to as the instructional episode.

The instructional episode serves as the formal educational vehicle that enables the learner to construct, or reconstruct, personal understandings, values, and beliefs. Instruction is complex because it occurs within a paradigm where each participating entity is within itself complex. Interaction between the Learner, the Content, the Media, the Teacher Function, and the Context within which learning is to occur during a given period of Time form the instructional episode (CMT paradigm). Considering all the interrelationships of the instructional episode causes the complexity of the learning process to increase exponentially. Yet, it is within this paradigm that all instruction occurs (Figure 1).

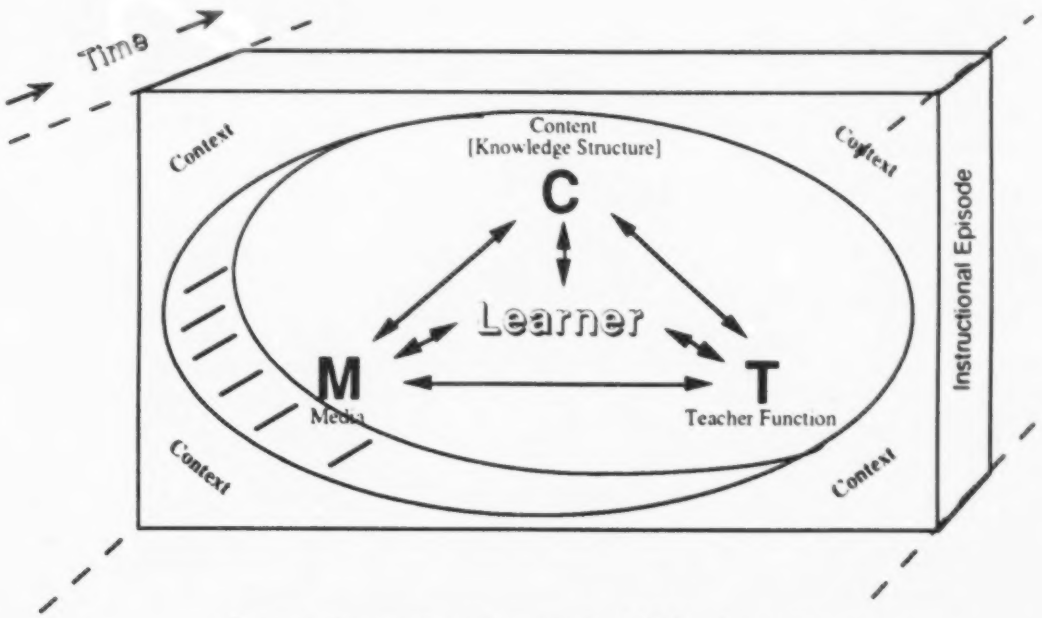

Figure 1. The complex environment in which learning occurs.

Within the CMT paradigm, the **learner** is the focus of instruction. Learners as individuals, bring multiple expectations, goals and diverse values to the classroom that affect how they interact during an instructional episode, and ultimately, how they learn. It is also important for instruction to account for the individual differences within the wider learner audience.

Content as a body of knowledge may be static or dynamic, but it is not a collection of unorganized facts existing in relative isolation one from the other (West, Fensham & Gerrad, 1985). Rather, there are certain orderly structures inherent within subject matter knowledge (Reigeluth, Merrill & Bunderson, 1978; Wilson, 1985). Information is not discrete, isolated bits of knowledge, but exists within an organized structure (Eylon & Reif, 1984). Such structures reflect the interconnections or interrelationships among the facts, concepts, and principles that make up subject matter knowledge (Anderson, 1983). Representations of information and interrelationships among information can be called knowledge structures (Hannum, 1988).

Media is the vehicle by which teachers stimulate, motivate, illustrate, provide concrete experiences, and direct attention. Mediated instruction which is related to the personal experiences of the learner will assist in building upon her or his prior knowledge and promote achievement, whereas messages communicated by various forms of instructional media that is foreign to the experiences of a student or offensive to the values of a student tends to inhibit learning.

Generally, the **teacher** functions as decision maker regarding what will be taught, when it will be taught, and how it will be taught. The teacher is often the primary information source unless the teacher functions solely as a facilitator of information. As facilitator, the teacher arranges classroom interactions so as to motivate learners and to guide the learner to different ways of knowing. Teachers direct learner actions, monitor progress, and manage the implementation of instruction.

The **context** within which instruction occurs directly and indirectly influences all decisions regarding any instructional episode. Instruction does not occur in a vacuum and failing to acknowledge such has a potential for a dangerous misunderstanding of the complexity of learning environments. The instructional context includes all the conditions which designers and teachers should consider in some regard to enhance learning. Certain contextual arrangements can be manipulated by designers and teachers while other contextual arrangements are beyond the realm of manipulation by either the designer or the teacher.

Learner achievement of prespecified outcomes depends on the chosen instructional strategy for a predetermined amount of **time**, such as during a class period or field experience. An instructional strategy will vary in effectiveness depending on the allotted time. Moreover, the quality of an instructional activity is affected by the amount of time that can be devoted to it. Further, the abilities of individual learners directly influence the amount of time required to achieve specific learning outcomes. Time, context, teacher function, media, content and the learner, interact simultaneously to form the complexities of instruction.

Instructional Design

As a discipline, instructional design is concerned with understanding and improving one aspect of education: the process of instruction (Reigeluth, 1983). Instructional designers have as their principle objective to induce targeted learners to perform in prespecified ways. They achieve results by developing and implementing documented and replicable procedures for organizing the conditions for learning; and by defining and measuring the accomplishments of instructional design in terms of learner performance (Burkman, 1987). The optimum effects of how student learning is facilitated and what actually occurs in the classroom environment determines what is done during the design of instruction which is different from what is done during the development of instruction. In addition, the role of evaluation in instruction and the management of activities associated with all aspects of instruction is conceptually and practically different. For the context of this study, descriptions of design, development, evaluation, and management as outlined in the "Domains of Instructional Technology" (Association for Educational Communications and Technology, in press) are used as a reference. Interpretations of those domains are presented below.

Instructional Design is the planning phase of the instructional creation process. Instructional design is descriptive, such as the presentation of natural or existing interrelationships that constitute a content area. Instructional design is also prescriptive. It recommends organization, or reorganization, of information or a sequence of events based on known learner characteristics, content as a knowledge structure, specific media and their attributes, salient features of the teacher function, educational context, and time available. Design aspects apply systems theory to address the complexity of the variables within the CMT paradigm, and organizes their interactions in intentional ways.

Instructional development is the process of producing from a detailed plan (design) the procedures and media which support an instructional episode. During the development phase, the instructional procedures and media are created and tested based on the performance objectives identified in the design. Instructional strategies prescribed in the design plan, as well as selection strategies and presentation

methodologies, are confirmed or revised based on the results of several appropriate iterations of testing throughout the various stages of development. Innovative and traditional technologies are employed to conduct development activities.

Instructional Evaluation is a dynamic process to obtain data about how students learn specific content information under varying instructional conditions. These data are analyzed and synthesized into ways and means that are used for judging the instructional potential of the planned instructional episode. Evaluation data collected during the design and development phases form the basis for revision of instructional strategies and influence choices of instructional media prior to the implementation of an instructional episode. Instructional evaluation initiates, permeates and concludes the instructional design and development process.

Instructional Management is concerned with the supervision of instructional episodes, including pre-episodic and post-episodic activities, as well as the human and financial resources to support an instructional episode. Legislation, governance, monitoring and certification of the instructional design, development, and evaluation processes needs the endorsement of management.

Teachers as Designers

Dick and Carey (1990), and Gagne, Briggs, and Wager (1992), perceived the teachers' role as that of designer of instruction with accompanying roles of implementor and evaluator of instruction. Others have taken the stance that generic instructional design skills have value for the classroom teacher (Applefield & Earle, 1990; Bielby, 1974; Dick & Carey, 1990; Dick & Reiser, 1989). The University of North Carolina at Wilmington, has integrated a two semester instructional design component into their undergraduate teacher education program (Applefield & Earle, 1990). Clearly the roles of classroom teachers are like that of instructional designers. In fact, taking on the role of instructional designer, on the part of public school teachers would have a great influence on the quality of the teachers' professional performance, and hence, on the level of their students' academic achievement (Figure 2).

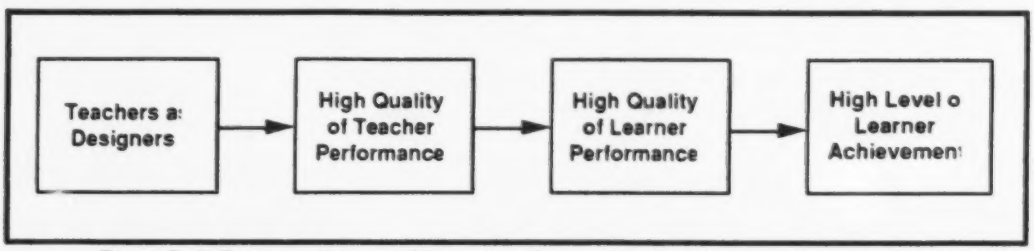

Figure 2. Influence on learner achievement when teachers practice instructional design.

The extent that classroom teachers currently engage in the kinds of activities practiced by instructional designers is unclear. The basic assumption is that successful classroom teachers prepare for daily instruction in much the same way that instructional designers create or improve instruction. However, to understand how good teachers express what it is that they "do" is essential to making instructional design meaningful for them. It is inappropriate for the instructional design community to change teacher language, but it is acceptable to clarify and promote good instructional design practices. To state specific instructional design concepts in understandable teacher language is a vital ingredient in research on instructional design. There is a need to find out if teachers understand the concepts of instructional design when asked if they "do" them. This calls for the translation of instructional design practices into teacher language.

Wildman and Burton (1981) indicated that too much time and effort have been spent on developing systematic approaches to the design of instruction without knowing whether these approaches can have widespread utility in the public education sector, or whether the approaches have utility as a device for transforming theoretical statements into practical applications. There is evidence of pre-service teacher success in acquiring and applying principles of learning and instructional design in the public education sector (Earle, 1992; Klein, 1991). However, the reality of the instructional context for public school teachers may require instructional technologists to reconsider the value of instructional design models intended for applications in public school environments.

The purpose of this study was to collect and summarize data that can be used to correlate teacher planning practices and instructional designer practices. The following assumptions were made in order to formulate the research questions: (1) teachers assume routines or patterns when preparing to teach, (2)

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instructional designers practice mainly planning activities, (3) the abundance of instructional design models are aimed at improving the instructional episode, and (4) instructional design jargon adversely affects teacher perceptions about the value of the systematic approach. Based on these assumptions, the following questions formed the impetus of this study: Is there a correlation between the planning routines of teachers and the actions of instructional designers?, and What contextual factors affect the degree of instructional design practiced by public school teachers?

Methodology

Participants

The participants for this study consisted of 61 public school teachers from the northeast United States. The participants included those currently teaching grades seven through twelve, and represented seven subject areas. The participant group was divided into two selected samples: 1) 41 junior or senior high school teachers from a central New York school district, and 2) 19 teachers who participate in a university-school partnership program in New York and throughout several adjacent states. Seventeen junior high school teachers were from a single building, and 23 high school school teachers were from a single building, both in the same school district. The university-school partnership teachers in addition to teaching regular high school level courses teach college level courses to high school students who receive college credit for each course successfully completed.

The participants were requested to complete a survey questionnaire. One hundred ten surveys were distributed and 61 returned. This yielded a return rate of 56%. The survey assessed the degree to which teachers employ practices characteristic of the instructional design process. This was achieved through combined efforts of interviewing teachers, generating a list of instructional designer practices, and translating the list of instructional design practices into language common to public school teachers.

Procedures

A list of instructional design practices was developed as a result of a content analysis based on an aggregate of recommended design and development competencies extracted from over 60 instructional design models (Andrews & Goodson, 1980; Branch, 1986; Briggs, 1977; Darwazeh, 1986; Dick & Carey, 1990; Gagne, Briggs & Wager, 1992; International Board of Standards for Training, Performance, and Instruction, 1986; Kerr, 1981; Martin, 1984; Reigeluth, 1983; Romiszowski, 1981).

Qualitative data about teacher planning routines was gathered to ascertain the language most commonly used by teachers when preparing to teach. Open-ended interviewing techniques with public school teachers was used to document "what goes through their minds" when they think about the teaching task. The responses of 15 informants was recorded. An informal assessment of the data indicates some natural overlap with the instructional designer practices. These data were used to aid the translation task in creating the survey instrument.

Instrument

A **Teacher Planning Inventory (TPI)** served as the survey instrument. The TPI is a 35- item questionnaire divided into two parts, and was used to find out the ways in which certain important events during teacher planning are carried out by teachers. Part 1 is comprised of the first 24 items and employs a forced-choice Likert scale for teachers to self-report their typical actions or cognitive processes while preparing to teach. Part 2 of the Inventory requests demographic information about the respondent such as age, gender, number of years teaching and typical class size. The list of instructional design practices and the Teacher Planning Inventory are parallel in content, however, the language is purposefully different. The Teacher Planning Inventory avoids instructional design jargon and uses language most familiar to public school teachers.

Many of the things that good teachers do, and which are legitimate instructional design concepts, are done in thought only. Some of the qualifying verbs used in the instructional designer priorities could be revised to reflect the common language of public school teachers. This was addressed throughout the formation of the inventory, and helped make the inventory more effective. Some of the concepts, such as motivational tactics and formative evaluation of instructional episodes, may be greeted by public school teachers with some skepticism. Reluctance to fully subscribe to the use of instructional design models was attributed more to practical constraints which were viewed as "realities" than because teachers believed they are unimportant.

Data Analysis

The overall mean recorded for each respondent on Part 1 of the questionnaire became the score of the participants. Frequency counts were conducted to identify relationships between participant scores by categorical data reported in Part 2. Crosstabulations formed the primary data analysis to determine correlations.

Results

The results indicate that a strong relationship exists between the planning activities of teachers and instructional design practices (Table 1). The overall mean was 7.0 on a 10 point scale, with a mean of 10 indicating the strongest possible relationship. However, there appears to be no correlation between years of teaching experience, class size, grade level, and level of teacher education and teacher practice of instructional design.

The results from Table 1 do suggest that the subject taught does influence the practice of instructional design by teachers. Science teachers reported the lowest mean of 5.3 compared a mean of 7.7 for English and Language teachers. Given the pattern of the mean scores on item 1 through 24 across the subject matter groupings (mathematics, science, etc.) an analysis of variance was conducted (Table 2) to reveal any statistically significant differences across those groups. The results of a liberal test of significance for general linear models indicate that subject taught affects the potential for teachers to practice instructional design.

Because a large percentage of one of the teacher groups (the University Partnership group) were math teachers, a further test for interaction was employed. No interaction effect was detected ($F=.64$, $p=.64$) indicating that subject matter taught could have an effect on the dependent variable (Table 3). However, due to the nature of the data collection there is a possible violation of the model, therefore, testing significance against a more conservative critical value is recommended. Use of the appropriate F_{GG} does not indicate statistical significance of difference in means across subject taught groups.

Table 1 Summary of Descriptive Data for Contextual Factors

Background Information	n	Mean	SD
Overall	**61**	**7.0**	**2.5**
Years of Teaching Experience	**56**	**7.1**	**2.4**
1 - 5	3	6.0	1.7
6 - 10	9	6.1	2.9
11 - 15	8	6.6	2.4
16 - 20	19	7.6	1.8
21 or more	17	7.3	2.9
Class Size	**58**	**7.1**	**2.4**
20 or less	25	6.8	2.6
21 - 35	33	7.3	2.3
Grade Level	**25**	**6.8**	**2.8**
Junior High	13	7.0	2.7
Senior High	6	5.8	3.0
Other	6	7.5	3.3
Education Level	**57**	**7.0**	**2.4**
Bachelors	15	6.7	2.3
Masters	39	7.0	2.4
Post-Masters	3	9.3	1.2
Subject Taught	**53**	**7.1**	**2.4**
Math	26	7.6	2.3
Science	7	5.3	1.9
English/ Language	7	7.7	1.9
Social Science	5	7.6	2.5
Other	8	6.1	3.2

Table 2 Summary ANOVA of Subject Taught

	DF	SS	MS	F	p
Between Subjects	4	6966.30	1741.58	3.11	0.02
Within Subjects	49	27428.53	559.77		
Total Within Subjects	53	34394.83			

Table 3 Interaction of Subject by Group

	DF	SS	MS	F	p
Subject	4	6464.63	1616.16	2.69	.04
Group	2	37.45	18.73	.03	.97
Subject into Group (Interaction)	4	1532.54	383.13	.64	.64

Conclusion

The potential for learner achievement is enhanced when teachers practice instructional design. Based on this study, however, additional empirical documentation is required. It appears that some instructional design practices may be beyond the realm of manipulation by public school teachers, and therefore a dialogue between instructional design professionals and public school teachers should be formalized. It is reflected here that instructional designers should consider instructional design models which combine common teacher planning routines with instructional design practices.

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